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Imaging

ACCURACY AND REPRODUCIBILITY OF CONTRAST ENHANCED AND NON-ENHANCED COMPUTED TOMOGRAPHY FOR PREDICTING THE ANGIOGRAPHIC DEPLOYMENT ANGLE IN TRANSCATHETER AORTIC VALVE REPLACEMENT (TAVR)

ACC Moderated Poster Contributions

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Background: Accurate device positioning in Transcatheter Aortic Valve Replacement (TAVR) requires an angiographic projection angle perpendicular to the native valve plane. This study assessed the accuracy and reproducibility of pre-procedural contrast and noncontrast CT to predict appropriate angiographic projection angles for use during device deployment.

Methods: CT projection angles were retrospectively determined by 2 independent readers in 58 patients who underwent contrast (n=39) or noncontrast (n=19) CT before TAVR with the Edwards SAPIEN valve. CT angles were derived by visually aligning the nadirs of the sinuses of Valsalva in a single 3D plane that traversed the hinges of all 3 leaflets. Accuracy of predicted CT angles was defined as the absolute difference between the cranial-caudal (CRA-CAU) angle from CT and corresponding angiographic CRA-CAU angle at the rotational (LAO-RAO) angle that was used for deployment. Intraobserver and interobserver variability were evaluated with Pearson correlation and Bland-Altman analyses. Angiographic angles were categorized according to the visual overlap of stent struts immediately after deployment, and graded excellent if the projected distance between the superior margins of the stent was less than half a cell height, fair if it was between half to a whole cell, and poor if it was greater than a full cell.

Results: Mean difference between the CRA-CAU angle predicted from CT and angiographic deployment angle was $7.3^\circ \pm 7.0^\circ$. There was good intraobserver agreement ($r=0.81$, $p<0.001$) with a difference between each read of $0.48^\circ \pm 4.8^\circ$, $p=0.46$, and good interobserver agreement ($r=0.81$, $p<0.001$) with a difference between readers of $3.6^\circ \pm 5.5^\circ$, $p=0.03$. Mean angle difference between CT and angiography was lower with contrast CT compared to noncontrast CT (6.4° v 9.1° , $p=0.03$). Angle difference was lower with increased deployment accuracy; mean difference was 6.3° , 6.8° and 13.8° , when strut overlap was graded excellent, fair, and poor, respectively.

Conclusion: Contrast and noncontrast CT predicted reasonably accurate angiographic projections for visualizing the aortic valve plane for deployment during TAVR.